FIG.1   WIRELESS ACCESS REFERENCE MODEL
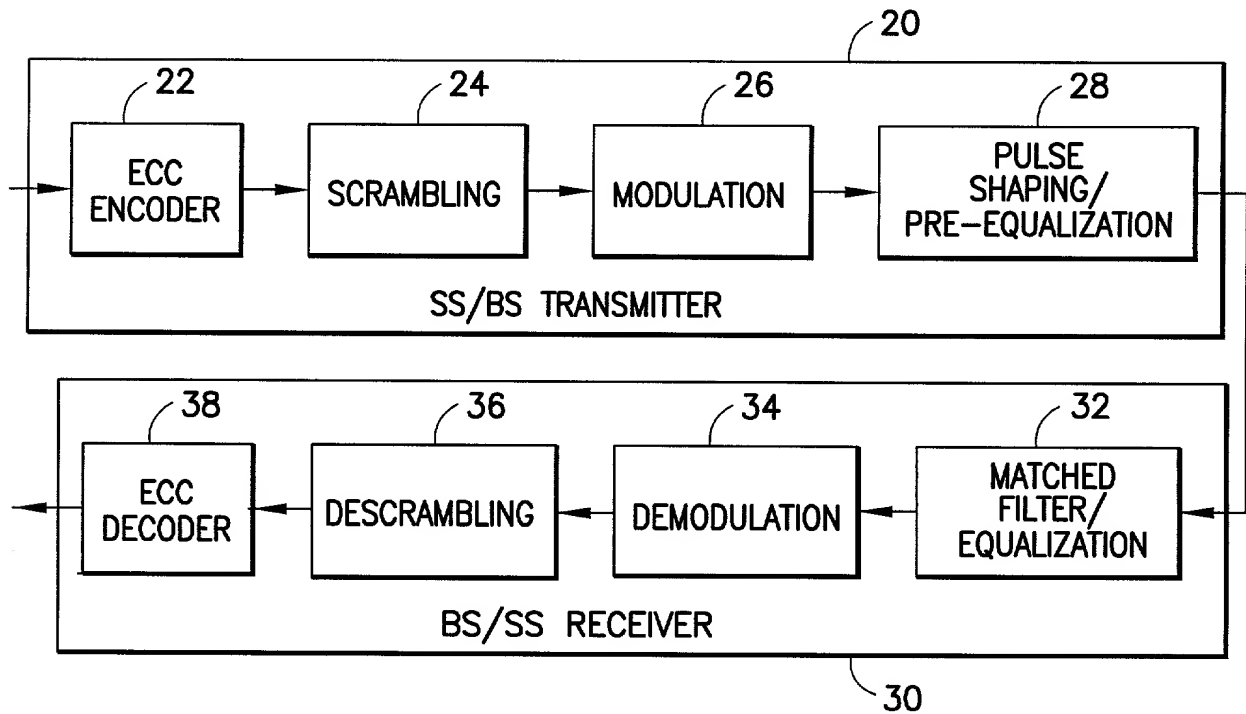

FIG.2   PHY REFERENCE MODEL SHOWING DATA FLOW
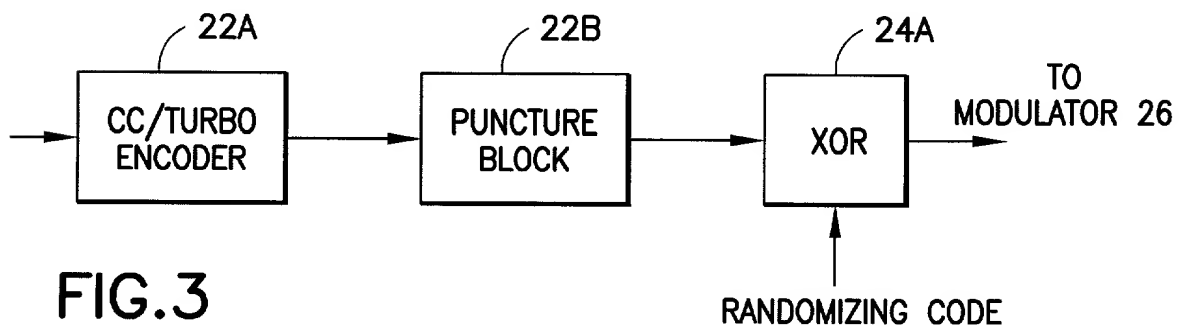

FIG.3

PARAMETER	MODULATION AND CHANNEL CODING		
	QPSK w/R=4/5 CODING (1.6 BITS/SYM)	16-QAM w/R=4/5 CODING (3.2 BITS/SYM)	64-QAM w/R=4/5 CODING (4.8 BITS/SYM)
RF CHANNEL BANDWIDTH	3.5 MHz	3.5 MHz	3.5 MHz
CHIP RATE	2.56 Mcps	2.56 Mcps	2.56 Mcps
COMMUNICATION CHANNEL BANDWIDTH	4.096 Mbps	8.192 Mbps	12.288 Mbps
PEAK DATA RATE	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=1)	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=16)	256 kbps	512 kbps	768 kbps
CDMA CHANNEL BANDWIDTH (SF=128)	32 kbps	64 kbps	96 kbps
MODULATION FACTOR	1.17 bps/Hz	2.34 bps/Hz	3.511 bps/Hz

FIG.4 HYPOTHETICAL PARAMETERS FOR A 3.5 MHz RF CHANNELIZATION

NUMBER OF ELEMENTS	QPSK		16 QAM		64 QAM	
	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR
1	4.096	1.17	8.192	2.34	12.288	3.511
2	8.192	2.34	16.384	4.68	24.576	7.022
4	16.384	4.68	32.768	9.36	49.152	14.044
8	32.768	9.36	65.536	18.72	98.304	28.088
16	65.536	18.72	131.072	37.44	196.608	56.176

FIG.5 AGGREGATE CAPACITY AND MODULATION FACTORS VERSUS MODULATION TYPE AND ARRAY SIZE
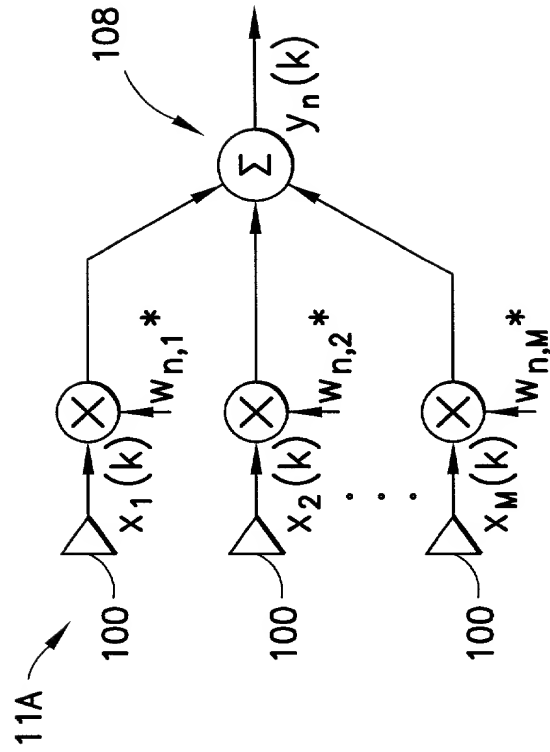
$$y_n(t) = [w^*_{n,1}\ w^*_{n,2} \cdots w^*_{n,M}] \begin{bmatrix} x_1(t) \\ x_2(t) \\ \vdots \\ x_M(t) \end{bmatrix}$$

FIG.6B

FIG.6A

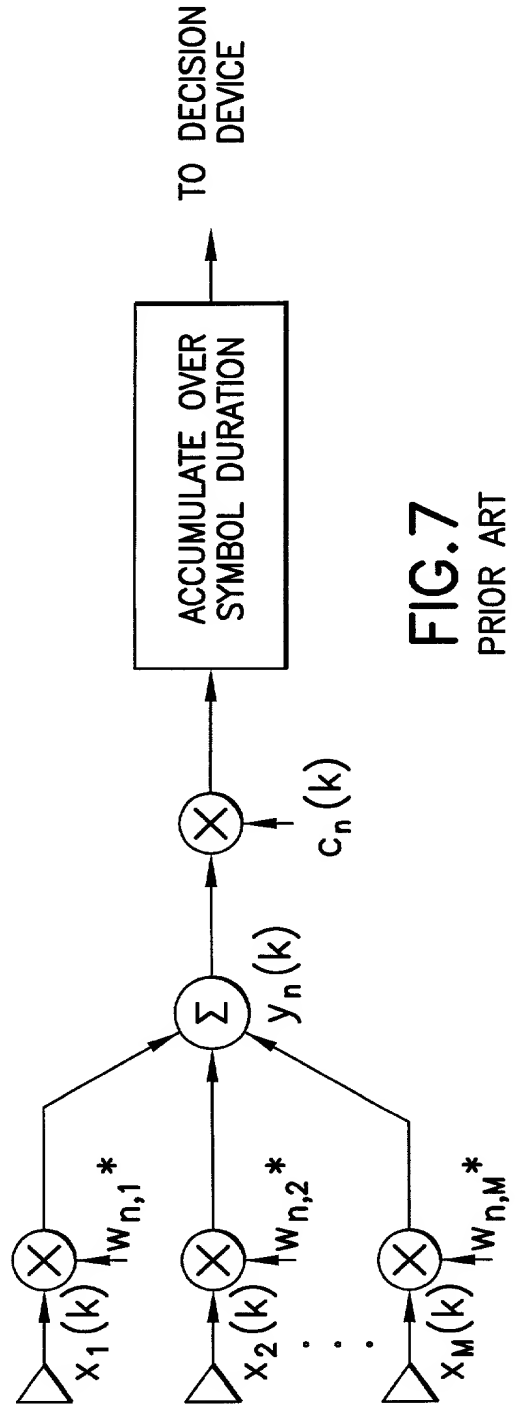FIG.7
PRIOR ART

TO DECISION
DEVICE

ACCUMULATE OVER
SYMBOL DURATION

FIG.8

ANTENNA
ELEMENTS

$x_1(k)$

$c_n(k)$

ACCUMULATE OVER
BIT DURATION

SPATIAL FILTER
FOR USER 1

TO DECISION
DEVICE

$x_2(k)$

$c_n(k)$

ACCUMULATE OVER
BIT DURATION

SPATIAL FILTER
FOR USER 2

TO DECISION
DEVICE

$x_M(k)$

$c_n(k)$

ACCUMULATE OVER
BIT DURATION

SPATIAL FILTER
FOR USER K

TO DECISION
DEVICE

100
102
104
106
108
M

ANTENNA
ELEMENTS

SPATIAL
FILTER   SPREADER

100

$x_1(k)$

$c_n(k)$

110

$w_{n,1}^*$

108

$x_2(k)$

$c_n(k)$

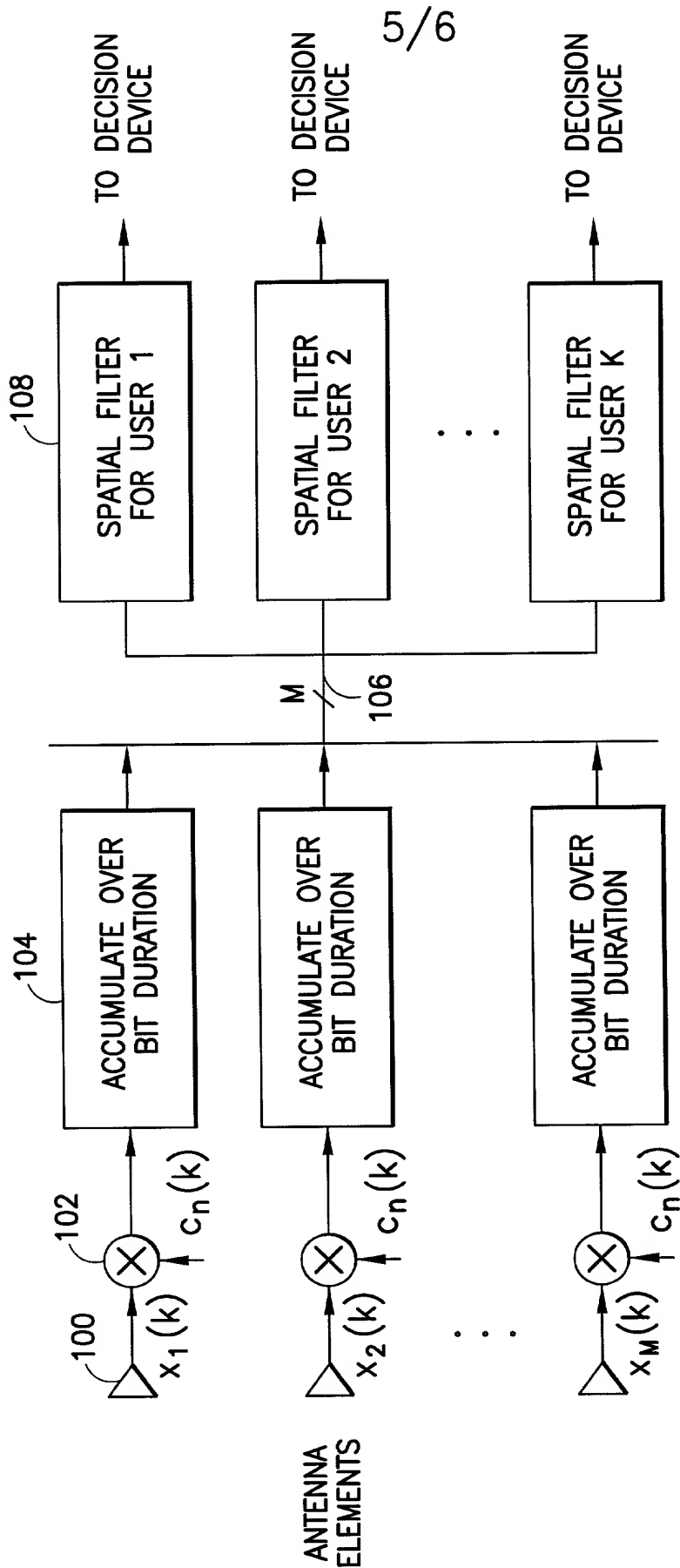$w_{n,2}^*$

$x_M(k)$

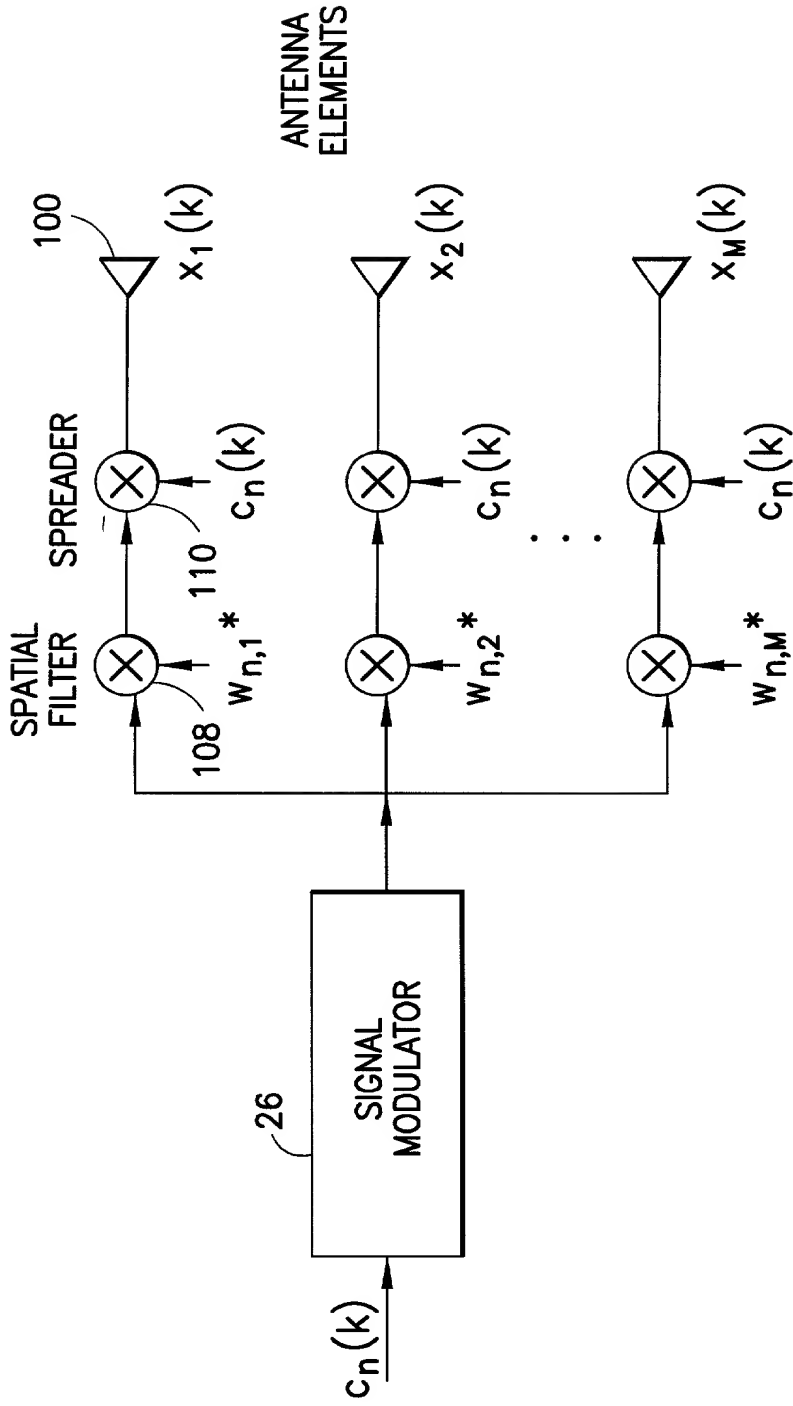$c_n(k)$

$w_{n,M}^*$

SIGNAL
MODULATOR

26

$c_n(k)$

FIG.9

$$v = \begin{bmatrix} \alpha_1 \exp(j\phi_1) \\ \alpha_2 \exp(j\phi_2) \\ \vdots \\ \alpha_M \exp(j\phi_M) \end{bmatrix}$$

FIG.10